

Proposition ✓ A declarative sentence.
True False

✓ Delhi is the capital of India.

✓ Delhi → 1) 1) 1) USA.

$$\begin{array}{r} \checkmark 2+2=4 \\ \hline \checkmark 2+3=7 \end{array}$$

$$\boxed{\checkmark x+1=3} \quad \text{if } x=7$$

What time it is?

Read this carefully.

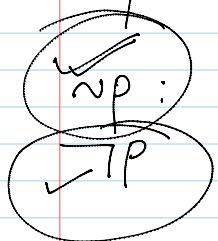
$$\begin{array}{r} \checkmark x+y=z \quad \text{if } x=1, y=2, z=3. \\ \cancel{x} \\ \boxed{2 \geq 100} \end{array}$$

Negation of a Prop. ($\neg p$) p, q, r, \dots .

If is not the case that (p)

p : Delhi is the capital of USA.

Truth Table		$\neg p$	$\neg\neg p$
1)	values.	$\checkmark T$	F
2)	$\checkmark F$	F	T

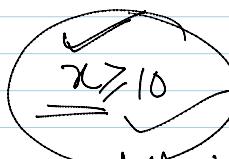


1) 1) not 1) 1) 1) 1)

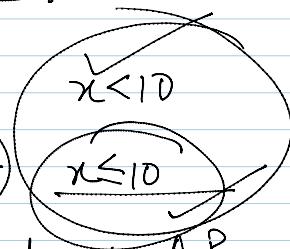
$$q: 2+2=4$$

$$\neg q: 2+2 \neq 4$$

p : Today is Wednesday



\neg 1) $\neg p$: 1) 1) not 1).



r : At least 10 inches of rain fell today in A.P.

$\neg r$: less than 10 1) 1) _____

~~X~~ At most 10 1) _____

p : Almost 75 students are present in this class.

$\sim p$: More than 75 \Rightarrow _____.

Compound Prop. p, q, r, \dots

Logical connectives.

Conjunction $p \wedge q = r$ is true if both $p \wedge q$ are true
otherwise it is false.

p	q	$p \wedge q$	$p \vee q$
T	T	T	
T	F	F	
F	T	F	
F	F	F	

p : Today is Wednesday.

$$q: 2+2=6.$$

Today is Wedne. and $2+2=6$

and but

$p \wedge q$

Sun is shining and it is raining in Hyderabad

p : Sun is shining in Hyderabad

q : It is raining. \Rightarrow

$p \vee q = r$ is false if both $p \wedge q$ are false

otherwise it is true.

p	q	$p \vee q$	$p \oplus q$
T	T	T	F
T	F	T	T
F	T	T	T
F	F	F	F

p : Today is Wed.

$$q: 2+2=6$$

Today is Wed. or $2+2=6$.

Inclusive OR Disjunction

Exclusive OR XOR

Students who have studied Maths or Comp. Sci.
can take this course.

$p \oplus q = r$

p : Student has studied Maths

q : \Rightarrow Comp. Sci

r is true if exactly one of $p \wedge q$ is true otherwise false.

$(p \oplus q) \Leftrightarrow$ is true if exactly one of $p \wedge q$ is true otherwise false.

Conditional Statement

p	q	$p \rightarrow q$
T	T	T
F	E	F
F	T	T
F	F	T

$\vdash p \rightarrow q \Leftrightarrow$ is false if p is true but q is false
 otherwise it is true.

hypothesis

antecedent
premise

conclusion

Consequence.